

Chesapeake Bay - Right Whale Ship Strike Reduction Measures

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Mid-Atlantic Region

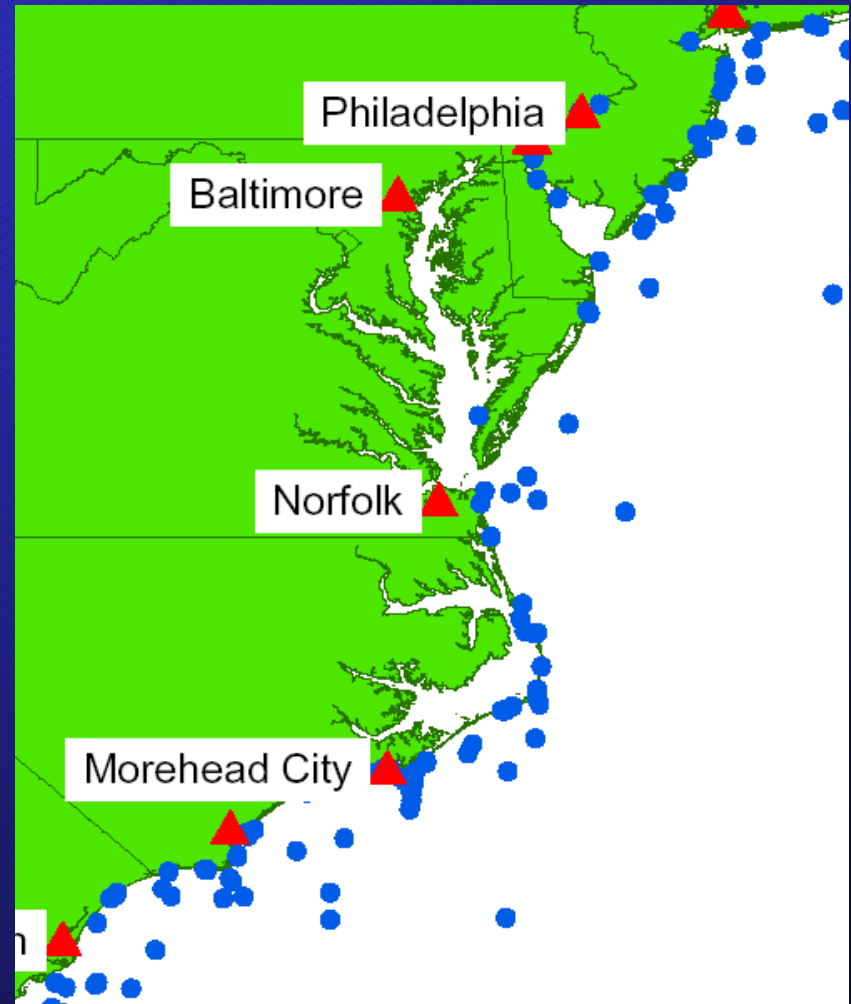
- Area south & east of Block Island Sound, Rhode Island to Port of Savannah, Georgia
- Between known high use areas in NE & winter calving area in SE



•Right Whale Sightings

- Generally observed in waters relatively close to shore

- 94% of sightings within 30 nautical miles of shore



Summarized from Knowlton et al., unpub. report

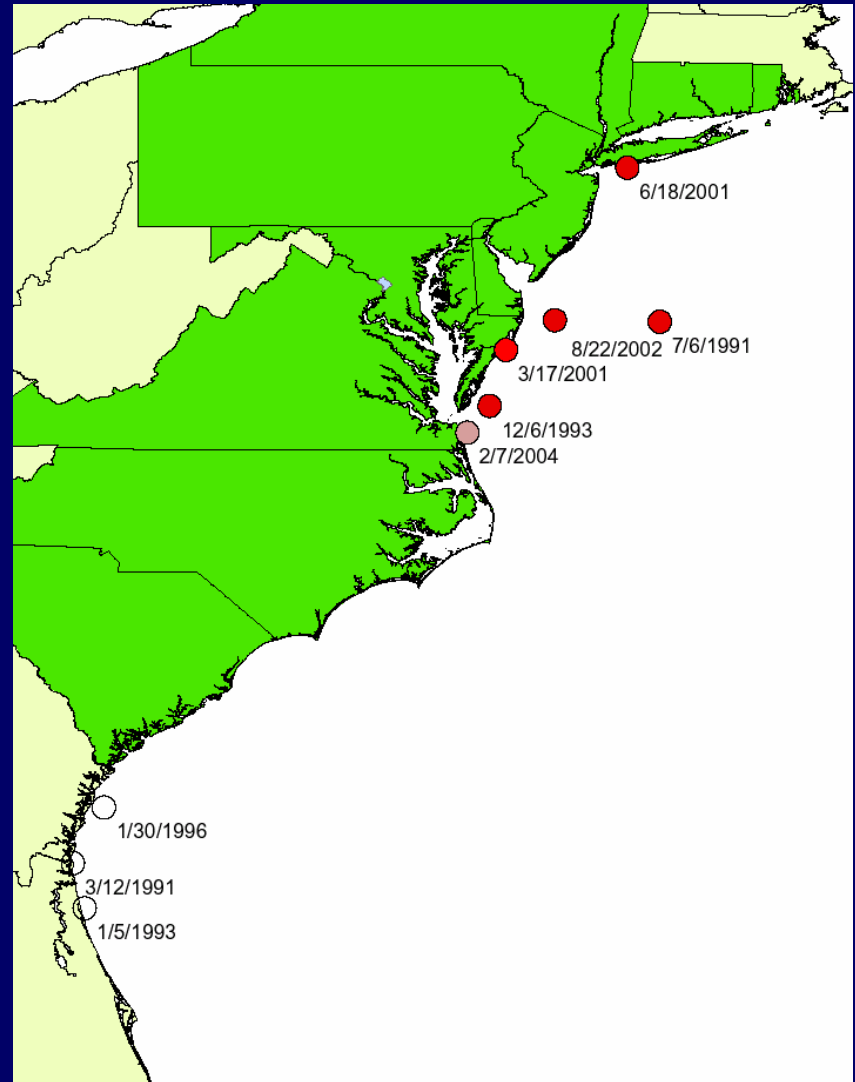
Seasonal Use of Mid-Atlantic Region

- **Migratory Corridor for**
 - *Pregnant Females* moving from NE to SE in fall (Sept-Nov)
 - **Other Population Segments** – juveniles, males
 - **Mother/Calf pairs Departing Winter Calving Area in SE for NE Areas** (March – May)

Mid-Atlantic Ship Strike Mortalities

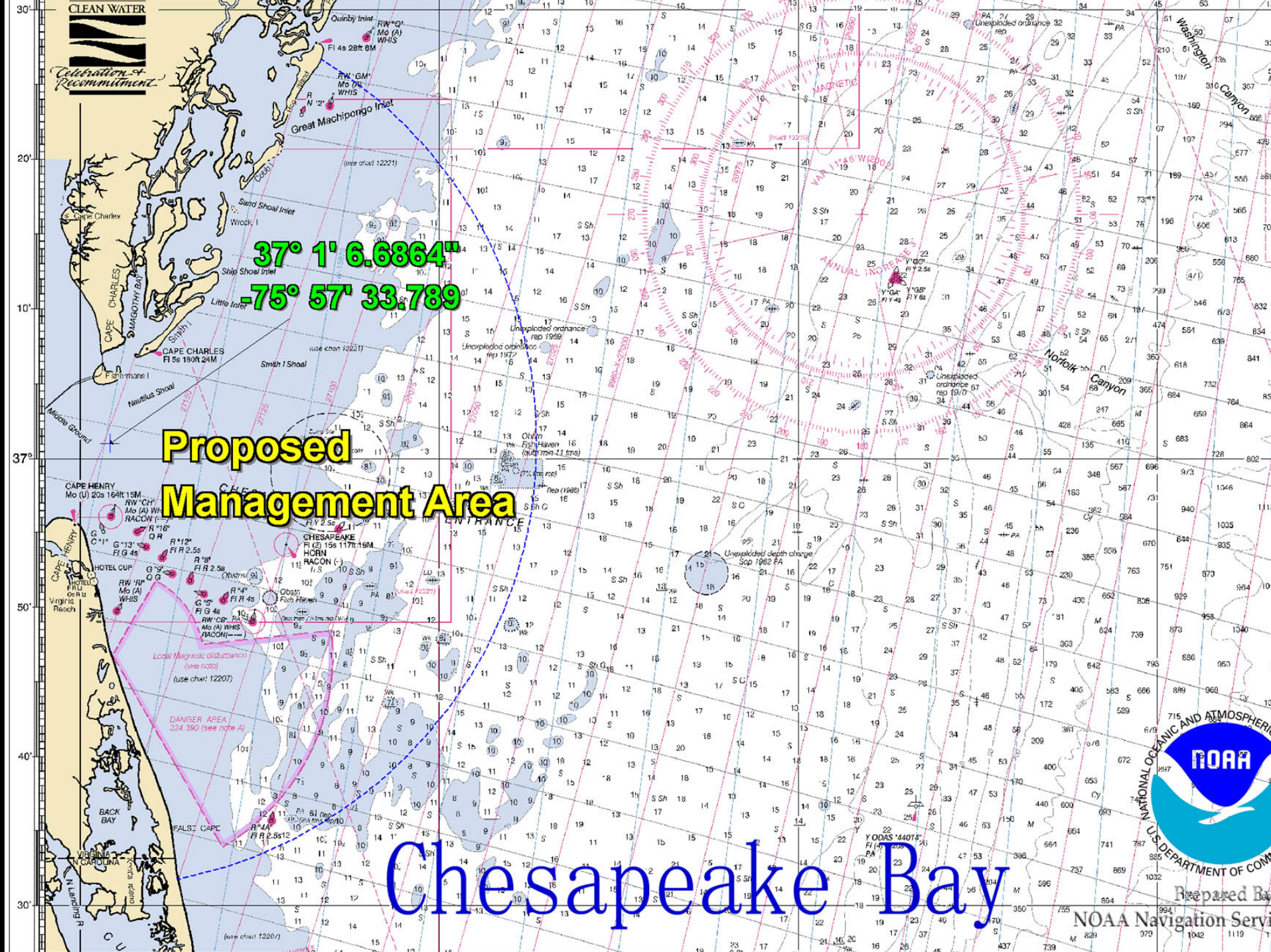
1991 - 2002

- 5 of 14 confirmed ship strike mortalities in the mid-Atlantic
- 3 ship strike mortalities occurred in last 3 years
 - Assateague Island Mar 2001
 - Long Island, NY June 2001
 - Ocean City, MD Aug 2002
- “Stumpy” in Feb 2004?



Chesapeake Bay Measures

- **Seasonal Management Area (SMA)**
 - Speed restrictions within 20-30 nm of the Bay COLREGS line --- 10 –14 knots *
 - Applicable period February – April and November - December * (~150 days/yr)
- **Dynamic Management applicable outside period of SMA**
- ***Distance, duration and speed subject to further analysis**



**Proposed
Management Area**

37° 1' 6.6864"
-75° 57' 33.789

Chesapeake Bay



Prepared by
NOAA Navigation Service

Economic and Vessel Traffic Management Analyses

- **Economic Aspects of Right Whale Ship Strike Management Measures — Kite- Powell & Hoagland, 2002**
- **Vessel Traffic Management Scenarios Based on Recommended Measures to Reduce Ship Strikes of Northern Right Whales - Russell, Knowlton & Beaudin Ring, 2003**

		<i>NY/NJ</i>	<i>Philadelphia</i>	<i>Baltimore</i>	<i>Hampton Roads</i>	<i>Wilmington</i>
<i>dry bulk</i>	<i>handy</i>	570				
	<i>handymax</i>	270				
	<i>Panamax</i>	50	1,900	1,100	2,500	250
	<i>Cape</i>	20				
<i>tanker</i>	<i>product</i>	1,710				
	<i>Aframax</i>	650				
	<i>Suezmax</i>	70	1,100	160	430	270
	<i>VLCC</i>					
<i>container</i>	<i>1000 TEU</i>	1,400				
	<i>1500 TEU</i>	1,000				
	<i>2000 TEU</i>	1,000				
	<i>3000 TEU</i>	1,000	100	500	1,200	110
	<i>4000 TEU</i>	1,200				
<i>LNG</i>				100		
<i>car carrier/RORO</i>		1,500				
<i>cruise</i>		550				
<i>tug/barge</i>	<i>dry</i>	600	2,200	1,700	4,000	1,000
	<i>tank</i>	1,000	5,000	1,800	860	600
<i>total</i>	<i>ships only</i>	10,990	3,100	1,860	4,130	630
	<i>ships&barges</i>	12,590	10,300	5,360	8,990	2,230

Table 1c: Port calls by port and vessel type, estimated from USACE (1999).

Additional information provided by the Port of New York and New Jersey.

Hampton Roads Traffic from ACOE

data 1999; Kite-Powell & Hoagland, 2002

- **Port calls by ships ~4000**
 - **Dry bulk**
 - **Container**
 - **Tankers**
- **Port calls by tug & barges ~4900**

Vessel Operating Speeds

- **Dry bulk - 14.5 knots**
- **Tanker - 14.5 knots**
- **Container – 24.0 knots**
- **Tug & barge - 12.0 knots**

From Kite-Powell & Hoagland, 2002

Estimated Economic Impact – Hampton Roads (\$353/ship call)

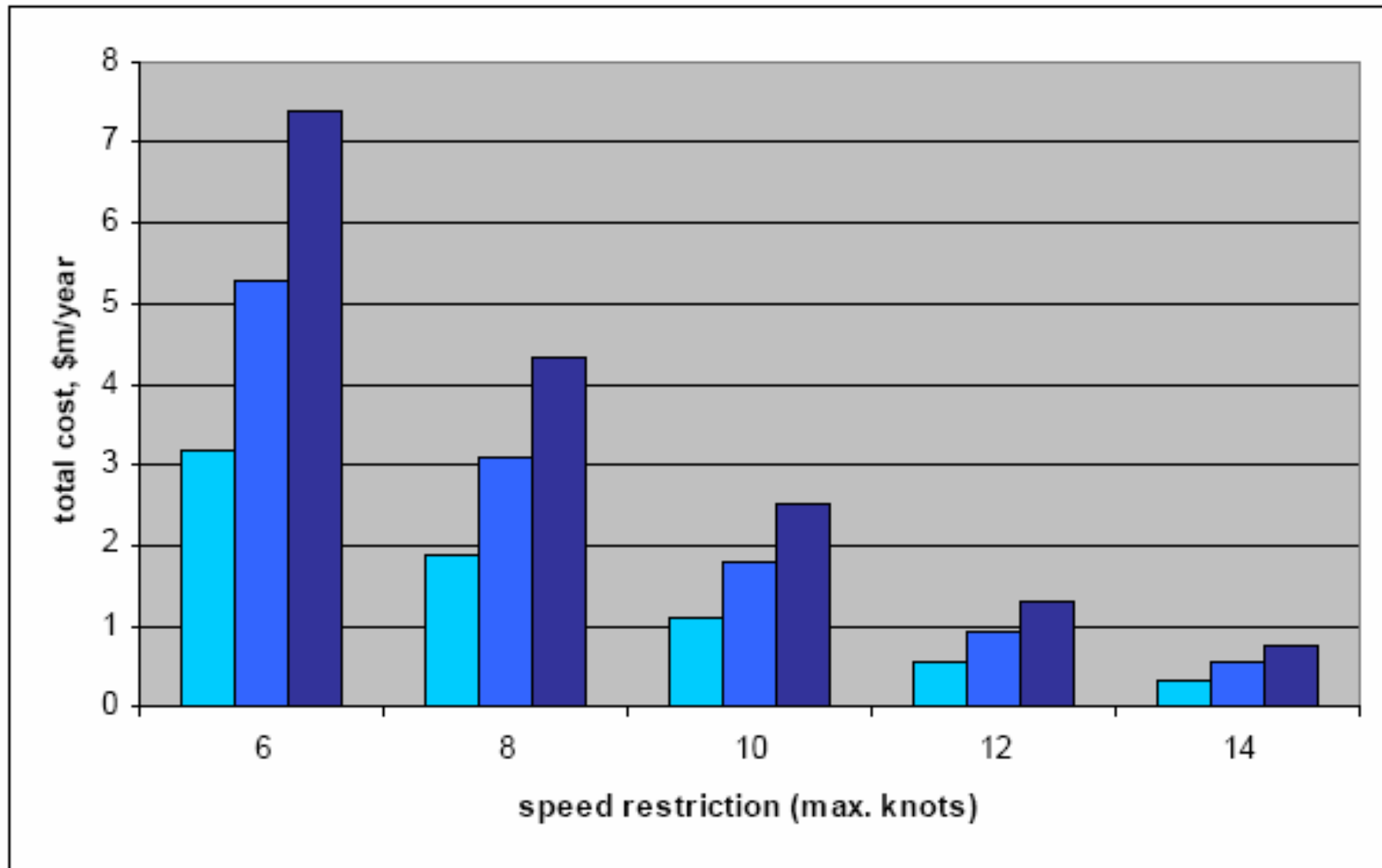


Figure 12: Annual operating cost increase due to speed restrictions for Hampton Roads traffic.

Base case: 10 knots limit over 25 nm for 60 days/year: \$1,789,000.

Sensitivity analysis on effective distance and duration of speed restriction:

restriction in place 60 days/year, and	15 nm	25 nm	35 nm
speed restriction over 25 nm, and	36 days/year	60 days/year	84 days/year

Port Entrance	Pilot embarkation	Speed at Pilot Buoy, VS_{PB}	Location of "Pilot Buoy" relative to harbor baseline or closing line
NY/NJ	Triangular cruising area west of Ambrose Light	No speed specified	6.8 nm
Delaware Bay	2.5nm SE of Cape Henlopen, DE	5 knots	2.5 nm
Chesapeake Bay	LWB "C"	No speed specified	2.85 nm
Wilmington, NC	1nm east of LBB "2CF"	6-8 knots	4.1 nm
Morehead City, NC	LBB "2BI"	5 knots	6.7 nm
Georgetown, SC	LWB "WB"	No speed specified	5.6 nm
Charleston, SC	LWB "C"	8-10 knots	12.5 nm
Savannah, GA	LWB "T"	8 knots	9.7 nm
Brunswick, GA	LWB "STS"	5-9 knots	6.7 nm
Fernandina Beach, FL	LB "STM"	6 knots	10.9nm (& 4nm)
Jacksonville, FL	LWB "STJ"	8 knots	4.2 nm

Table 2 shows the location of the pilot embarkation point, typically in the vicinity of a buoy, the so called "pilot buoy;" and the maneuvering speed, VS_{PB} , that the local pilots' association ask that vessels maintain for boarding a pilot. (Source: U.S. Coast Pilots 2, 3, 4 and communications with regional pilots' associations).

Additional Transit Time - Sea Speed to Maneuvering Speed

Vessel Type or Category	Average Vessel Speed, knots	Additional Transit Time, ΔT_{VS-RS} , in minutes, for a vessel to slow from sea speed to maneuvering speed		
		10 Knot speed restriction	12 Knot speed restriction	13 Knot speed restriction
Dry bulk----	14	9	4	2
handy				
handymax	14	9	4	2
Panamax	14.5	9	5	3
Cape	14.5	9	5	3
tanker--product	14	9	4	2
Aframax	15	10	6	4
Suezmax	14.5	9	5	3
VLCC				
Containership--	15	10	6	4
1000TEU				
1500TEU	15	10	6	4
2000TEU	24	18	15	14
3000TEU	24	18	15	14
4000TEU	24	18	15	14
LNG	20	15	12	11
Car Carrier	16	11	8	6
Cruise ship	25	18	16	14
tug/barge--freight	12	5	0	0
--tank	12	5	0	0

Table 1 shows the average sea speed for various vessel types calling at US East Coast Ports (Kite-Powell and Hoagland, March 2002); and the additional transit time, ΔT_{VS-RS} , as a function of proposed speed restrictions, for vessels to slow from

Table 3c

Hampton Roads Chesapeake Bay

Additional Transit Time, minutes

Additional Transit Time, minutes

Additional Transit Time, minutes

@ RS = 10 Kts

@ RS = 12 Kts

@ RS = 13 Kts

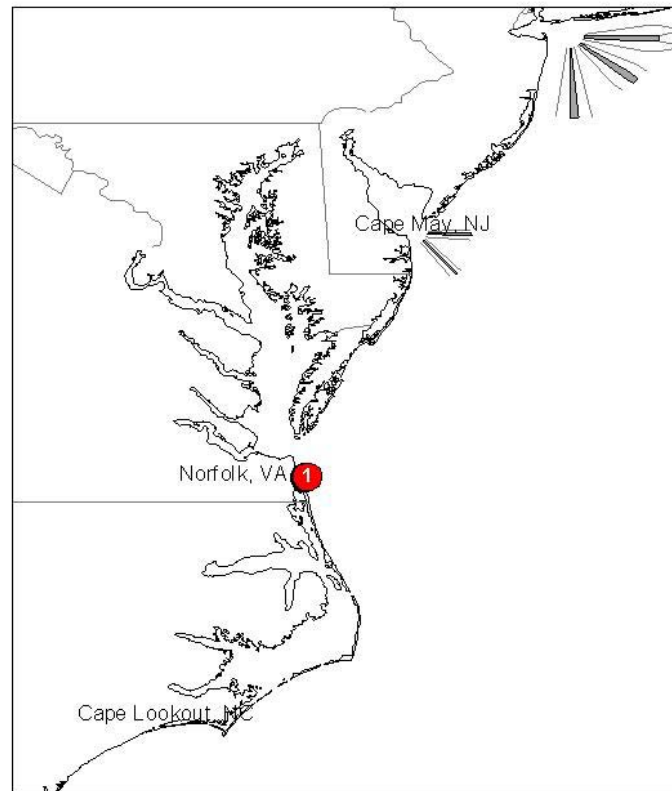
Location of Pilot buoy @ 2.85 nm		20	25	30	20	25	30	20	25	30
Vessel category	Speed									
dry bulk—handy	14									
Handymax	14									
Panamax	14.5	34	37	43	22	21	23	16	14	14
Cape	14.5									
tanker—product	14									
Aframax	15									
Suezmax	14.5	34	37	43	22	21	23	16	14	14
VLOC										
container-1000TEU (15kt)	15									
--1500TEU	15									
--2000TEU	24									
--3000TEU	24	55	67	81	43	51	61	38	44	52
--4000TEU	24									
LNG	20									
Car Carrier	18									
Cruise ship	25									
tug/barge--freight	12	22	21	23	0	0	0	0	0	0
--tank	12	22	21	23	0	0	0	0	0	0

Table 3c shows the additional time required with proposed speed restrictions of 10, 12 and 13 knots and proposed geographic extent of the seasonal management areas (SMA) of 20, 25 and 30 nautical miles for vessels calling in the Hampton Road area (Chesapeake Bay).

Chesapeake Bay – additional time with proposed speed restrictions

- **Ranges from**
 - **14 minutes @ 13 knots @ 25nm to**
81 minutes @ 10 knots @ 30nm

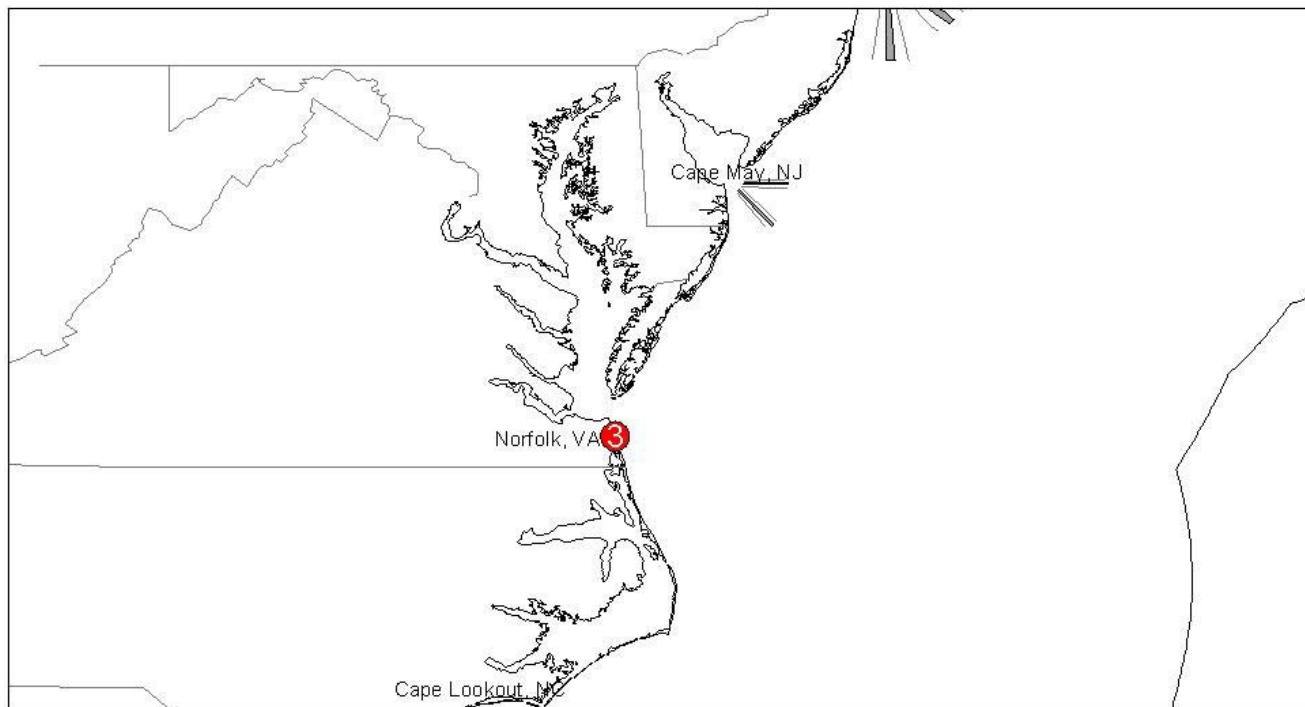
Russell, Knowlton & Beaudin Ring, 2003



Right Whale Zones for January 7, 2004



NOAA Fisheries
Northeast Fisheries Science Center
Woods Hole, MA



Right Whale Zones for January 8, 2004

NOTE: These aggregations may persist for two or more weeks.



**NOAA Fisheries
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Woods Hole, MA**